

B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2013)

Second Semester

U13EET212-ELECTRICAL AND ELECTRONIC CIRCUITS

(Common to CSE & IT)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

- The specific resistance or resistivity of a material is inversely proportional to
 - Area
 - Length
 - Resistance
 - Temperature
- The two laws of kirchoff's are_____ and_____
- The ratio of RMS value to Average value of any waveform is called as
 - Peak factor
 - Form factor
 - Maximum value
 - Peak value
- At resonance, the inductive reactance is equal to_____
- When a trivalent impurity is added to the intrinsic semiconductor, introduces _____ type semiconductor.
 - P type
 - N type
 - PN type
 - NP type
- The maximum efficiency of the full wave rectifier is (in %)._____
- In Bipolar Junction Transistor, the layer with lightly doped and thin is
 - Collector
 - Base
 - Emitter
 - Gate
- The Silicon Controlled Rectifier consists of _____no. of layers and _____ no. of Junctions
- The output voltage of a certain op-amp changes by 20 V in 4 μ s.What is its slew rate?
 - 50 V/ μ s
 - 5 V/ μ s
 - 80 μ Vs
 - 800 mVs
- The oscillator frequency of Op-Amp phase shift oscillator (with an RC phase shifting network) is _____

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. A resistor of 3.6 ohm is connected in series with another of 4.56 ohms. What resistance must be placed across 3.6 ohms so that the total resistance of the circuits shall be 6 ohms.
12. For the given Delta resistances such as $R_{AB} = 50$ ohm, $R_{BC} = 70$ ohm, $R_{CA} = 100$ ohm, find the equivalent star resistance values.
13. An alternating current of frequency 60 Hz has a maximum value of 120 A. Write down the equation for its instantaneous value. Also find the time taken to reach 96 A for the first time.
14. For a given series RLC circuit with $R=10$ ohms, $L=10$ mH, $C=1$ microfarad, calculate the Resonant frequency, Quality factor and Bandwidth.
15. Define i) Maximum forward current ii) Peak Inverse Voltage of PN junction diode.
16. Define ripple factor and the efficiency of the rectifier.
17. Illustrate the three possible configurations of transistor each with the diagram.
18. Expand the term MOSFET and give its types.
19. Write a note on the concept of relaxation oscillator.
20. What is comparator and write its applications.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Explore the different stages involved in Operational Amplifier and list out the parameters related to OP-amp and explain them in detail respectively.
22. a) (i) Two resistors 12 ohms and 6 ohms are connected in parallel and this combination is connected in series with a 25 ohms resistance and a battery which has an internal resistance of 0.25 ohms. Determine the emf of the battery if P.D across 6 ohm resistance is 6 volts. (10)
(ii) Define i) Electrical power ii) Electrical energy. (4)

(OR)

- b) A Wheatstone bridge ABCD has the following details: $AB = 1000$ ohms. $BC = 100$ ohms, $CD = 450$ ohms, $DA = 5000$ ohms. A galvanometer of resistance 500 ohms is connected between B and D. A 4.5 volt battery of negligible resistance is connected between A and C with A positive. Find the magnitude and direction of current through the galvanometer.

23. a) A coil of resistance 10 ohms and inductance 0.1 H is connected in series with a 150 microfarad capacitor across 200 V, 50 Hz supply. Calculate (i) Inductive reactance, capacitive reactance, impedance, current and power factor and (ii) the voltage across the coil and capacitor respectively.

(OR)

- b) Define and derive the RMS and Average value of sinusoidal quantity.

24. a) (i) Give the comparison of rectifiers (Half wave, Full wave and Bridge) for the following particulars. (9)

- i. No. of diodes used.
- ii. Maximum efficiency
- iii. No load dc voltage(in terms of maximum voltage)
- iv. Average current / diode
- v. Ripple factor
- vi. Peak inverse voltage(in terms of maximum voltage)
- vii. Output frequency (in terms of input frequency)
- viii. Form factor
- ix. Peak factor.

- (ii) What is the purpose of filters? List out its types. (5)

(OR)

- b) (i) Write a short note on PN junction diode under different biasing condition. (8)

- (ii) Write about the zener diode as a voltage regulator. (6)

25. a) Explain the characteristics of BJT under three different configurations.

(OR)

- b) Sketch and explain the basic construction of an SCR and explain its operation. Draw typical SCR characteristics.
